

HOW DO SOAP FILMS REACT TO GAS COMPOSITION?

LABORATORY : IN COOPERATION WITH :

Institut Lumière Matière
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LEVEL : TEAM(S) :

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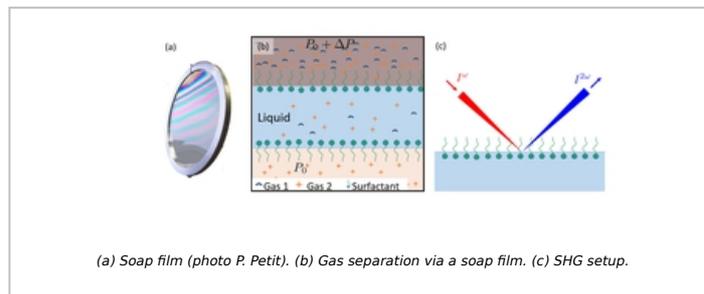
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KEYWORD(S) :

soap films / liquid-gas interfaces

SCIENTIFIC CONTEXT :

A **soap film** (fig. a) is a nanometric liquid layer sandwiched between two gas domains. It is also a **liquid membrane** (fig. b), permeable to the surrounding gas, which will never clog contrary to solid membranes. These properties are crucial to develop new energy-efficient chemical separation processes, currently corresponding to 10-15% of worldwide energy consumption. This requires to better understand the specific **adsorption of gas species on layers of surfactants** (soap molecules) to be able to tune their selectivity.



MISSIONS :

The objective of the internship is therefore to study the interactions of the surfactant laden interfaces with the surrounding gas. Two methods will be used. First, **non-linear optics** (Surface Harmonic Generation, fig. c) will be used to probe a single liquid-gas interface. This technique has the specificity to be highly surface-sensitive, and we will get information on the adsorbed gas and surfactant structure at the interface. Second, the case of a soap film with two interfaces will be considered. The student will use a **Thin Film Pressure Balance** to explore how the interactions between the facing interfaces are modified by the gas atmosphere.

OUTLOOKS :

The internship is part of the wider project SELFI funded by Région AURA (collab. LiPhy/iLM/Teclis)